

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application.

1. (Currently Amended) A method for determining targeted water content in a predetermined environment comprising:

measuring water within solid waste by injecting at least two gas tracers within solid waste to measure a fraction of void space filled with water, and

determining an amount of water to be added to said environment, wherein one of said gas tracers is conservative and does not react with solids or liquids, and a second gas tracer partitions into the water and is separated from the conservative tracer during at least a portion of said method wherein the second gas tracer is selected from the group consisting of a halogenated aliphatic compound, a weak acid, a weak base, and a polar organic compound.

2. (Currently Amended) A method of claim 1 wherein said tracers comprise helium and ~~difluoromethane~~ difluoromethane.

3. (Original) A method of claim 1, wherein said tracers are injected and chromatographic separation of the tracers is measured between a point of tracer injection and a point of tracer extraction such that the degree that the second partitioning tracer is retarded correlates to the average water saturation in the environment..

4. (Original) A method of claim 1, wherein said conservative tracer comprises at least one noble gas or one perfluorinated compound.

5. (Original) A method of claim 4, wherein said conservative tracer is selected from the group consisting of neon, helium, argon, and perfluorinated compounds.

6. (Currently Amended) A method of claim 5, wherein each of said conservative tracers tracer has a low affinity for water (K_H) and has negligible affinity for solid waste (K_d) and a gas-water phase interface.

7. (Currently Amended) A system comprising

at least two tracers comprising:

- (i) a conservative tracer is that does not partition significantly into solids or liquids within landfills, and
- (ii) a partitioning tracer that partitions into bulk water, but has minimal affinity for a gas-water phase interface or for solid waste, and

~~a chromatograph detector capable of measuring separation of said at least two tracers after said tracers have been injected into a material wherein the partitioning tracer is selected from the group consisting of a halogenated aliphatic compound, a weak acid, a weak base, and a polar organic compound.~~

8. (Original) A system according to claim 7, wherein each of said tracers are nontoxic, nonbiodegradable, and detectable within a gas phase.

9. (Original) A system according to claim 7, wherein said tracers are absent from landfill gas and/or found at negligible concentrations within said gas phase.

10. (Cancelled).

11. (Original) A method of claim 1, wherein said partitioning tracer is employed that has a retardation dominated by bulk water in the environment, such that sorption onto solid waste and a gas-water interface are negligible in comparison, and wherein said conservative tracer has minimal affinity for solid and liquid phases in the environment.

12. (Currently amended) A method suitable for measuring water in ~~a biofilter, said biofilter being engineered porous media intended to degrade pollutants in a gas stream,~~ said method comprising

injecting at least two gas tracers within said ~~biofilter media~~ to measure a fraction of void space filled with water, and

determining an amount of water to be added to said ~~biofilter-media~~ wherein one of said gas tracers is conservative and does not react with solids or liquids, and a second gas tracer partitions into the water and is separated from the conservative tracer during at least a portion of said method.

13. (Currently amended) A method of claim 12, wherein said water is supplied to said ~~biofilter-media~~ to maintain optimal moisture conditions for biodegradation.

14. (Currently Amended) A tracer kit comprising at least two tracers comprising

(i) a conservative tracer that does not partition significantly into solids or liquids within landfills, and

(ii) a partitioning tracer that partitions into bulk water found in landfills, but has minimal affinity for gas-water phase interface or for solid waste wherein the partitioning tracer is selected from the group consisting of a halogenated aliphatic compound, a weak acid, a weak base, and a polar organic compound.

15. (Original) A kit of claim 14, wherein said tracers are nontoxic, nonbiodegradable over a predetermined time period, not easily detectable within the gas phase, and/or absent from landfill gas and/or found at only small concentrations within the gas phase.

16. (Original) A kit of claim 14, wherein said conservative tracer comprises at least one noble gas and/or one perfluorinated compound.

17. (Currently amended) A kit of claim 14, ~~wherein each of said tracers said conservative tracer~~ has a low affinity for water (K_H) and has negligible affinity for solid waste (K_d) and a gas-water phase interface.

18. (Cancelled).

19. (New) A method of claim 1, wherein the second gas tracer is selected from the group consisting of fluoromethane, difluoromethane, and 1,1,1-trifluoroethane.

20. (New) A method of claim 1, further comprising a water saturation between 0.09 and 0.39.
21. (New) A method of claim 12 wherein said media is a biofilter.
22. (New) A method of claim 12, wherein said second gas tracer is selected from the group consisting of a halogenated aliphatic compound, a weak acid, a weak base, and a polar organic compound.
23. (New) A method of claim 12, wherein said second gas tracer is selected from the group consisting of 1,1,1-trifluoroethane, fluoromethane, and difluoromethane.